(No Model.)

4 Sheets—Sheet 1.

J. M. COLBERT.

CAN CAPPING MACHINE.

No. 549,629. Patented Nov. 12, 1895.

FIG. 1.

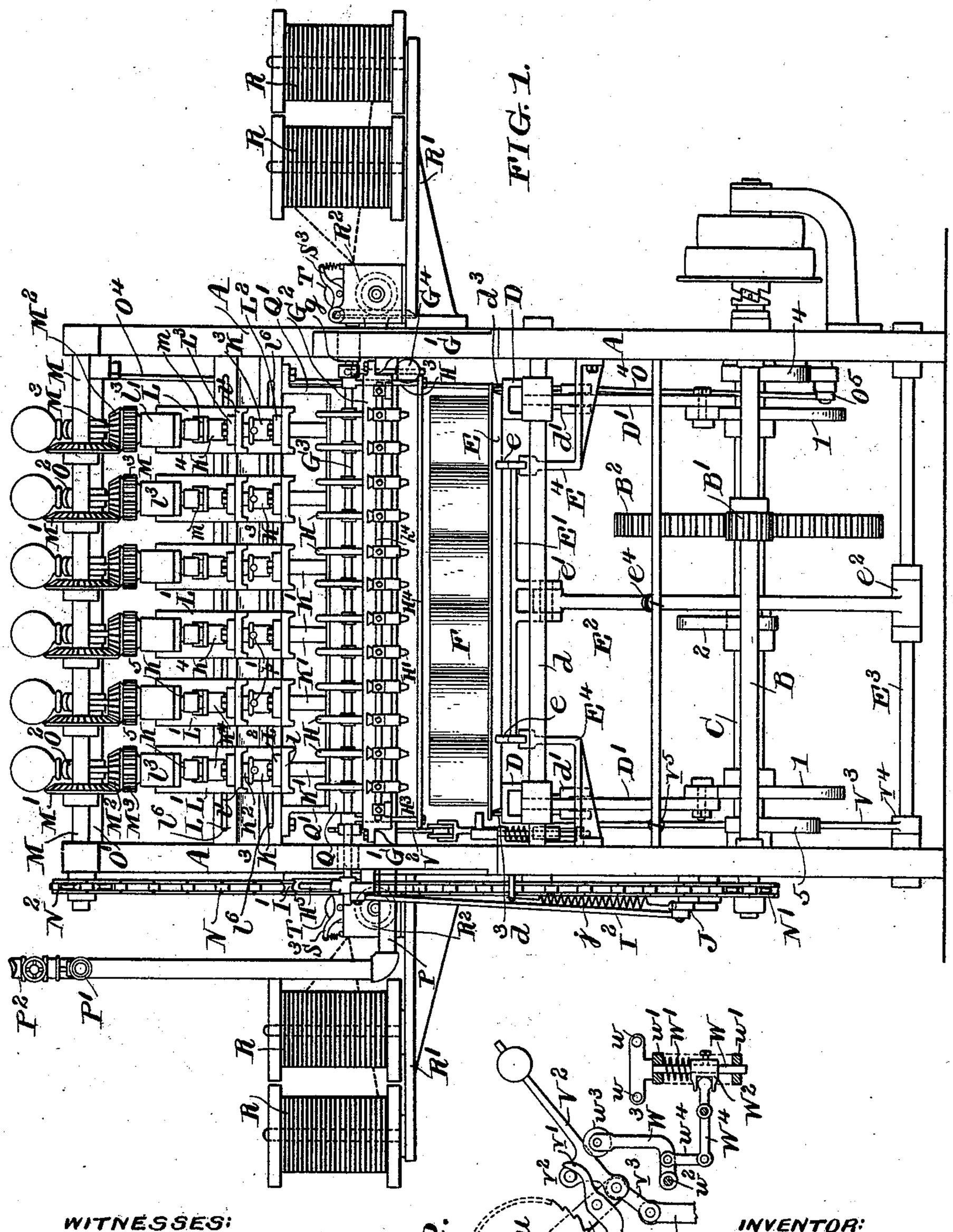
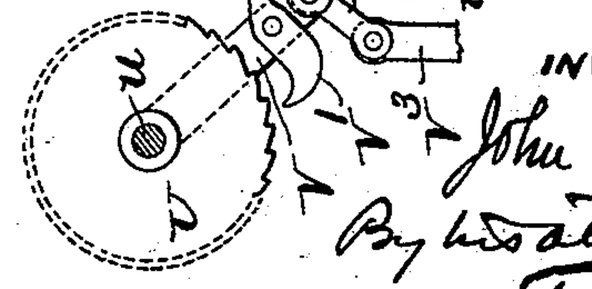


FIG. 2.



WITNESSES:

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Wm. L. Evans

INVENTOR:

John M. Colbert

By his atty

Thos. Hunt & Co

(No Model.) 4 Sheets—Sheet 2.

J. M. COLBERT.

CAN CAPPING MACHINE.

No. 549,629. Patented Nov. 12, 1895.

FIG. 3.

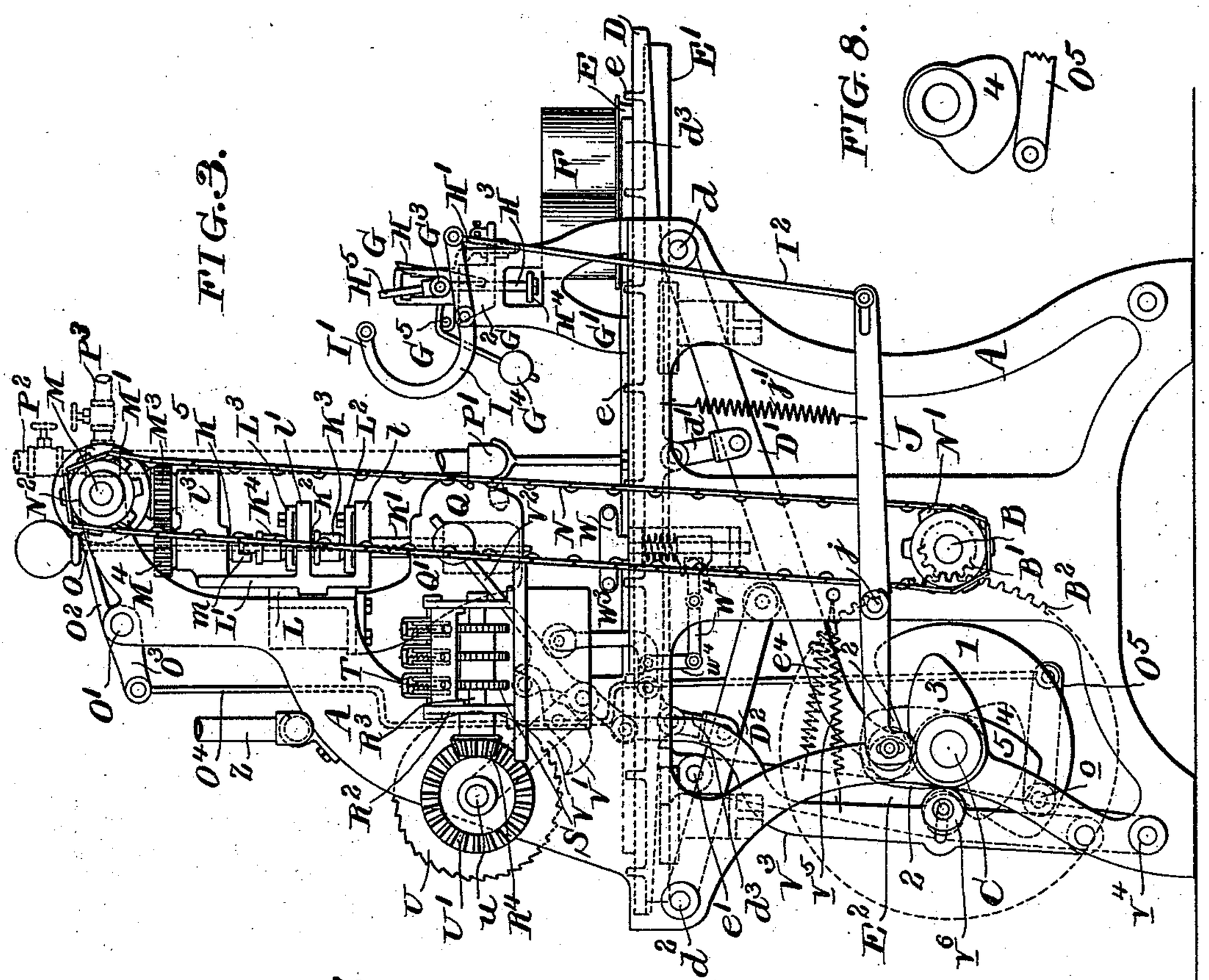


FIG. 8.

FIG. 2.

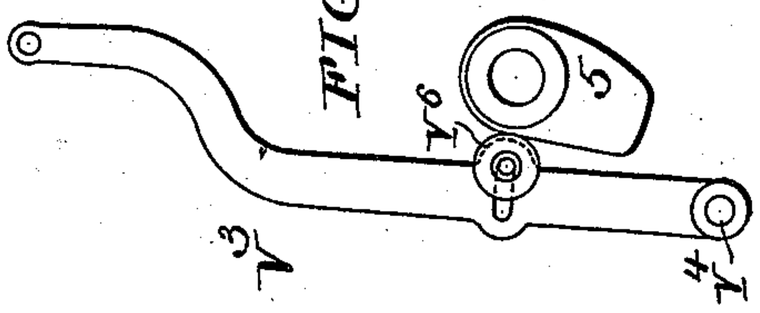


FIG. 4.

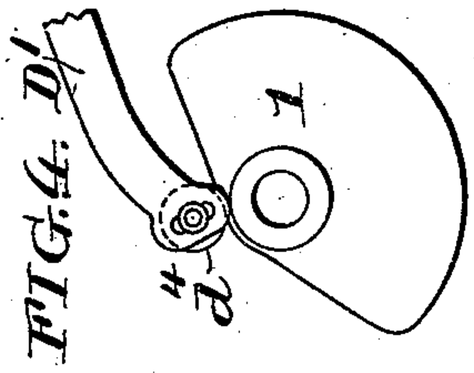


FIG. 6.

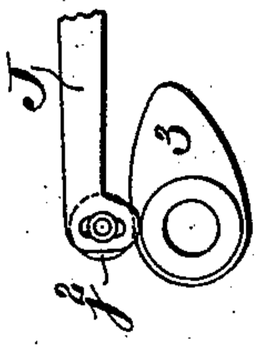
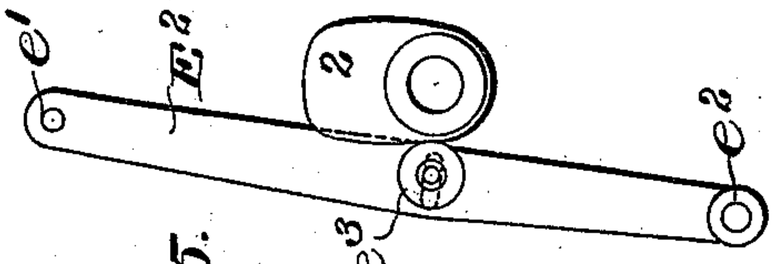


FIG. 5.



WITNESSES

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(No Model.) 4 Sheets—Sheet 3.

J. M. COLBERT.

CAN CAPPING MACHINE.

No. 549,629. Patented Nov. 12, 1895.

FIG. 13.

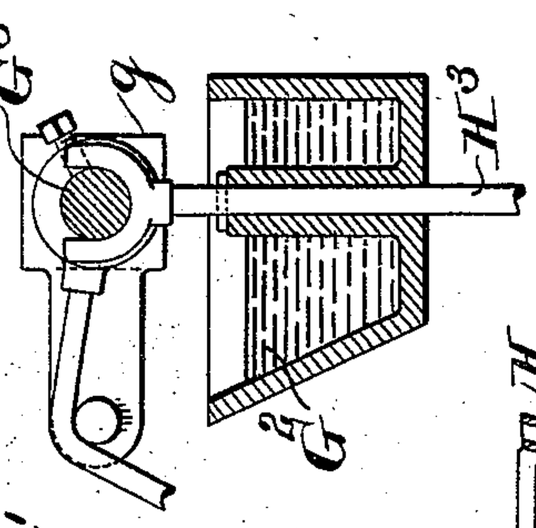


FIG. 12.

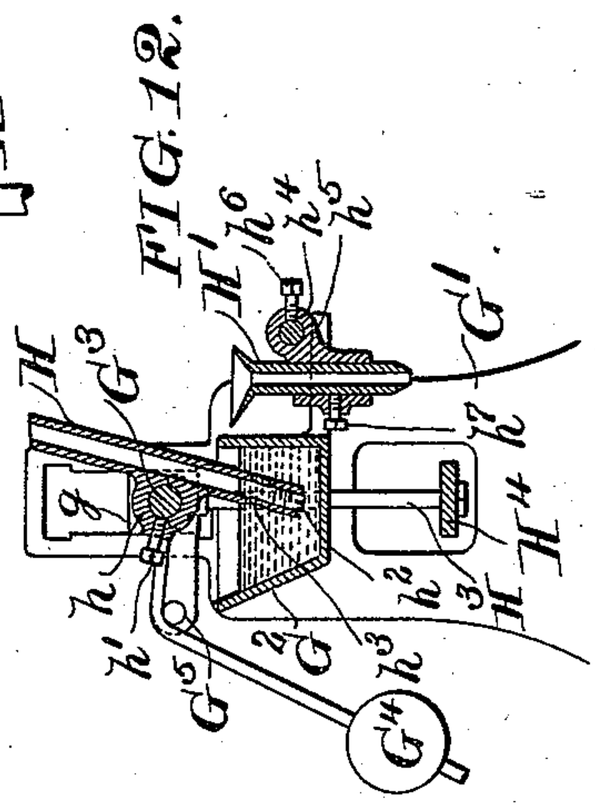


FIG. 10.

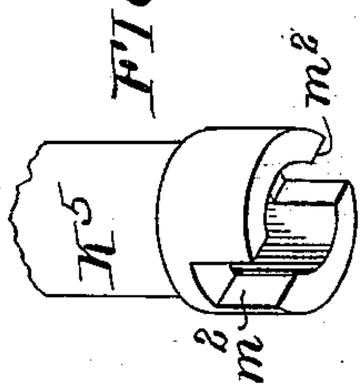


FIG. 11.

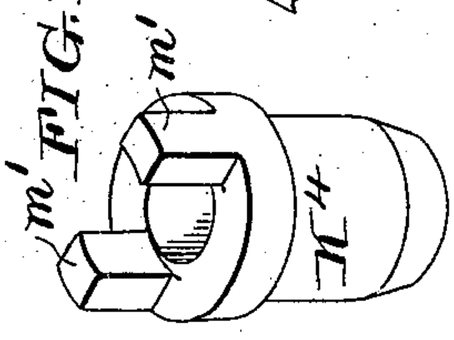
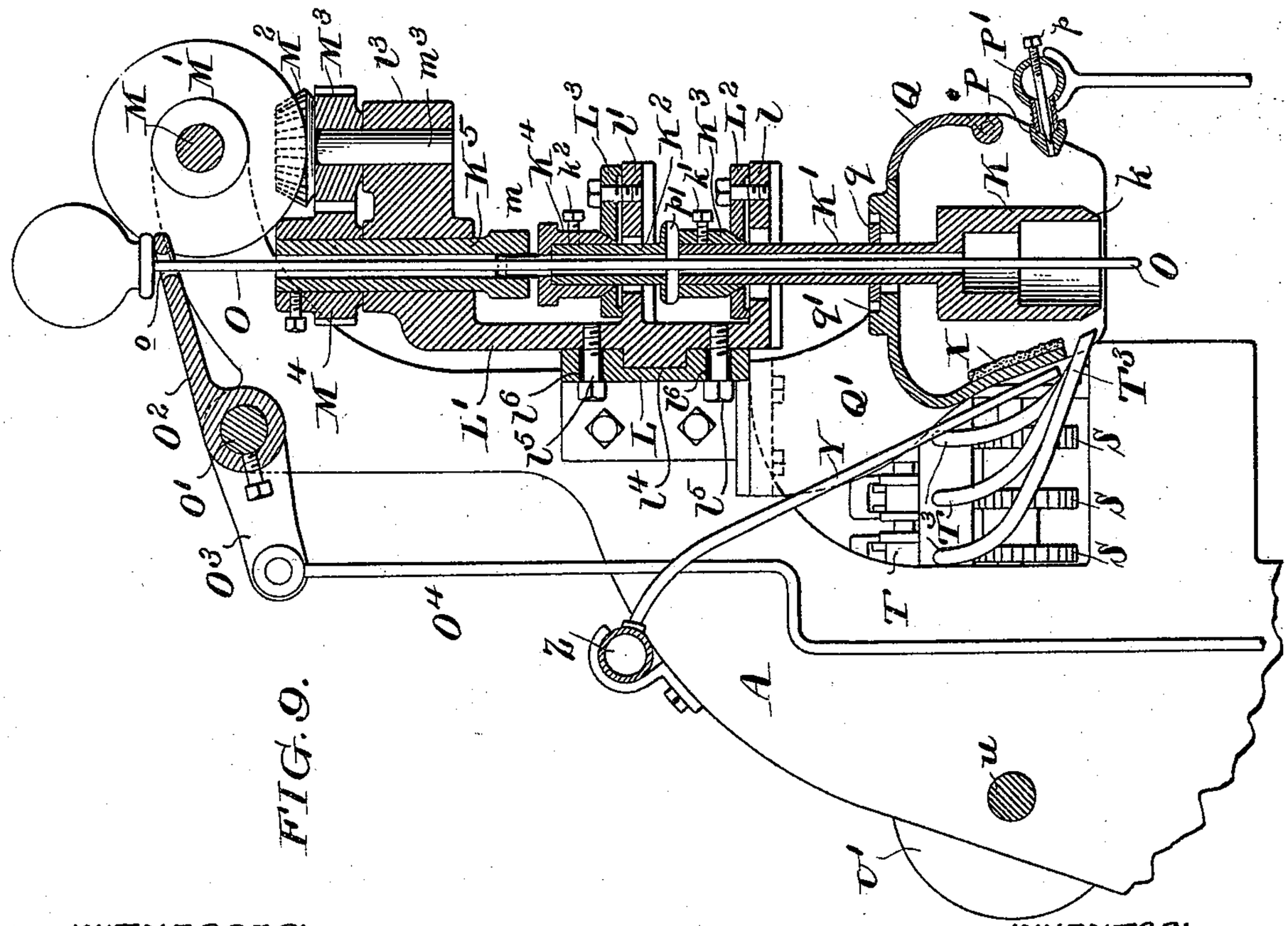


FIG. 9.



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(No Model.) 4 Sheets—Sheet 4.

J. M. COLBERT.

CAN CAPPING MACHINE.

No. 549,629. Patented Nov. 12, 1895.

FIG. 16.

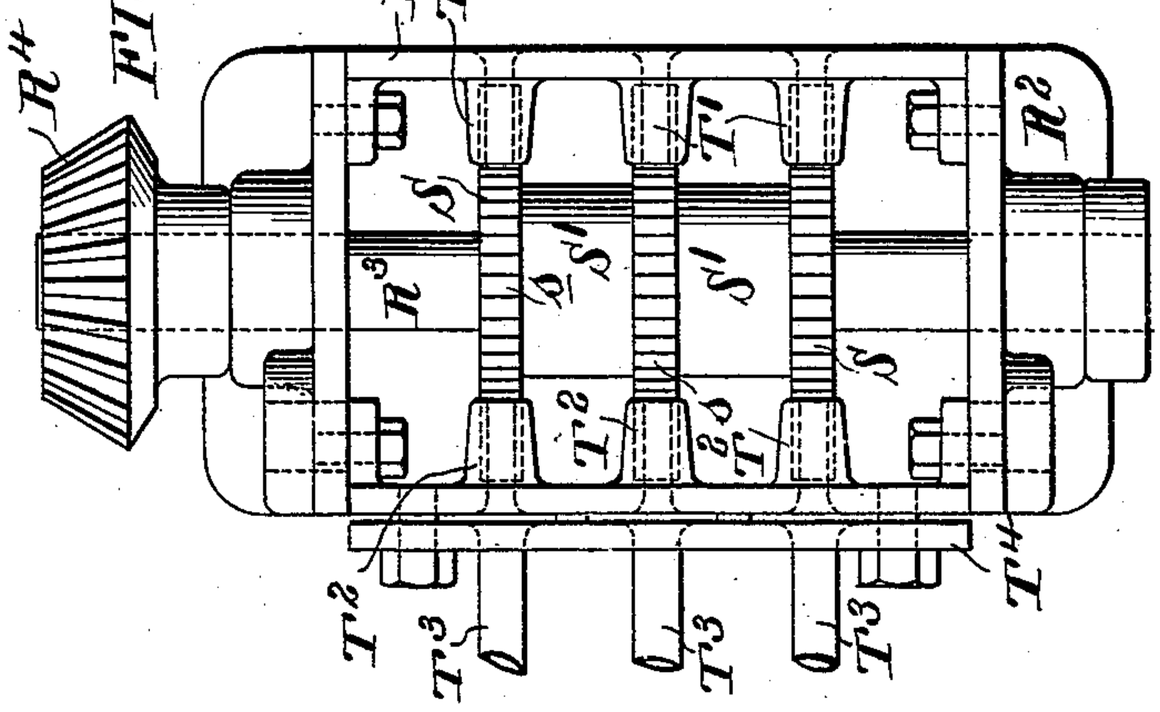


FIG. 17.

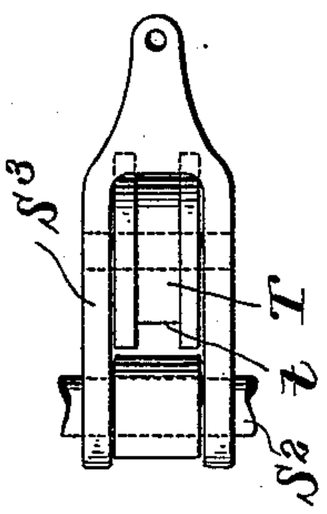


FIG. 15.

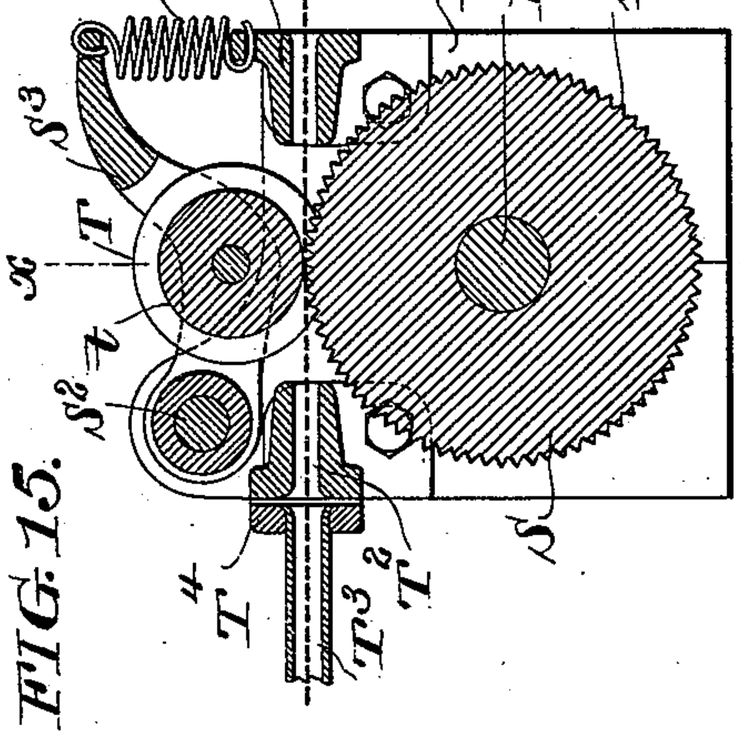
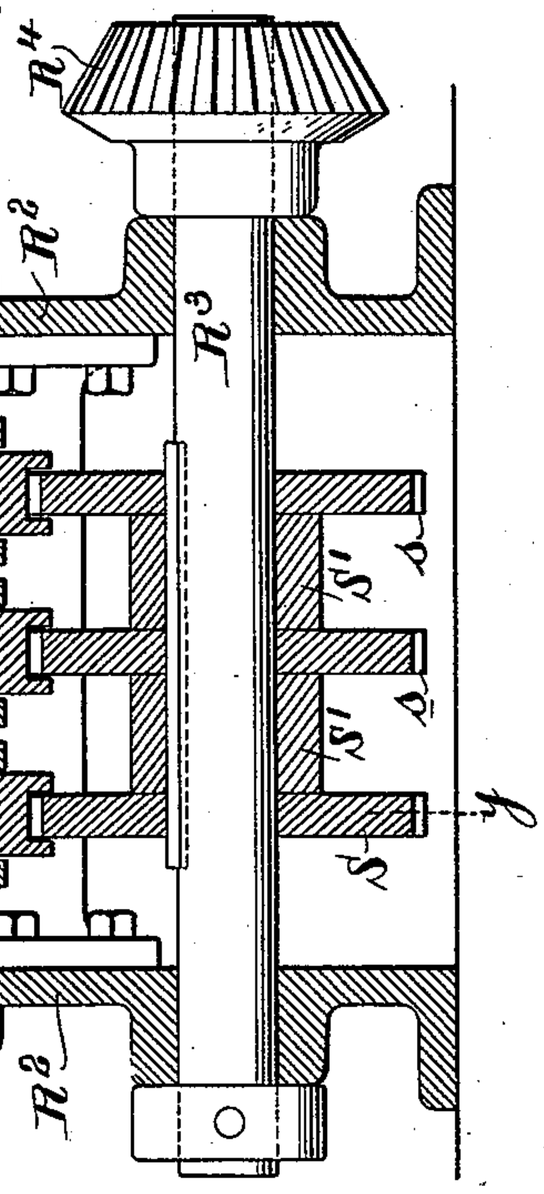


FIG. 14.



WITNESSES:

Henry Drury

Thos. L. Evans

INVENTOR:

John M. Colbert

By his atty

Thos. L. Evans & Co.

UNITED STATES PATENT OFFICE.

JOHN M. COLBERT, OF MANTUA, NEW JERSEY.

CAN-CAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,629, dated November 12, 1895.

Application filed June 10, 1895. Serial No. 552,353. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. COLBERT, of the city of Mantua, county of Gloucester, and State of New Jersey, have invented an Improvement in Can-Capping Machines, of which the following is a specification.

My invention relates to can-capping machines; and it consists of certain improvements, which are fully set forth in the following specification and are shown in the accompanying drawings.

I have shown my improvements embodied in a machine designed for performing continuously the complete operation of capping and adapted to operate simultaneously upon a series of cans. Such machines embrace feeding mechanism for conveying the cans, acid-supplying devices for supplying the acid to the cans adjacent to the caps, solder-feeding mechanism, and soldering or capping irons. My invention relates to improvements in these different sets of mechanism and in the combination thereof in an organized machine, whereby the construction is simplified and a more efficient operation is obtained.

I shall now refer to the accompanying drawings for the purpose of particularly describing my improvements.

Figure 1 is a front elevation of a can-capping machine embodying my improvements. Fig. 2 is a detail view of a portion of the devices for operating the solder-feeding mechanism. Fig. 3 is a side elevation of the machine. Figs. 4, 5, 6, 7, and 8 are respectively detail views of various operating cams and levers for imparting the desired movements to different portions of the mechanism. Fig. 9 is a vertical sectional view, enlarged, of the upper portion of the machine. Figs. 10 and 11 are perspective views, respectively, of the upper and lower couplings of the spindle of one of the soldering-irons. Fig. 12 is a vertical sectional view of the acid-feeding devices. Fig. 13 is a similar view, enlarged, of a portion of the same. Fig. 14 is a longitudinal vertical sectional view of the solder-feeding devices on the line $x\ x$ of Fig. 15. Fig. 15 is a transverse vertical sectional view of the same on the line $y\ y$ of Fig. 14. Fig. 16 is a plan view of the solder-feeding devices with the upper rollers removed. Fig. 17 is a plan view of one of the said upper rollers and its frame.

For the sake of clearness I shall describe the various portions of the mechanism separately.

The Can Carrying and Feeding Devices.

A A are the usual side frames of the machine, suitably connected by transverse girts or rods.

B is the driving-shaft, from which power is transmitted through the gears B′ B² to a counter or cam shaft C, which carries the cams for imparting the desired movements to the different portions of the mechanism.

D D are two longitudinal supporting-frames located about the middle height of the machine inside of the side frames A and adapted to support the can-trays and raise and lower the cans. These frames may be provided with longitudinal ribs d^3 to center and retain the trays.

D′ D′ are levers fulcrumed adjacent to each side frame A on a cross-shaft d and bearing at their free ends upon cams 1 1 on the camshaft C. These levers are each connected by a hinge or link d' with the front portion of the corresponding supporting-frame D, so that the movement imparted to the levers D′ D′ by the cams 1 1 will raise and lower the frames D D at one end.

D² D² are levers fulcrumed on a cross-shaft d^2 at the rear portion of the machine and each bearing at its free end on the corresponding lever D′, so that the motion imparted to the levers D′ D′ by the cams 1 1 will be communicated to the levers D² D². The levers D² D² are similarly connected with the rear portion of the supports D D by hinges or links d^3, so that their movements act to raise and lower the supports D D at the rear end. The free ends of the levers D′ D² may be provided with the usual rollers d^4.

E′ is a reciprocating feed-frame extending longitudinally between the supporting-frames D D and provided with projecting fingers or lugs e, engaging the edges of the trays, so that the reciprocation of frame E′ will feed the trays over the supports D D. The trays are so constructed that the fingers or lugs e will engage their edges. Separate trays for

each row of cans may be used, or trays for two or more rows of cans, with recesses or longitudinal notches on their lower surfaces to receive the lugs or fingers *e*, may be employed.

E^2 is a rocking lever hinged at one end, as at *e'*, to the feed-frame E' and at the other end, as at e^2, to a shaft E^3 in the lower part of the machine. The lever E^2 is rocked by a cam 2 on the cam-shaft C and may be provided with an antifriction-roller e^3 at the contact-point. A spring e^4 between the lever and a stationary part of the machine holds the lever in contact with the cam 3 and produces the return movement.

E^4 E^4 are guides for the feed-frame E', carried by the side frames A A and supporting and guiding the frame E'.

The backward reciprocation of the feed-frame E' takes place while the trays are lifted by the elevation of the supports D D and while the trays are thus lifted free from the lugs *e* of the feed-frame.

The Acid-Supplying Devices.

G are the acid-supplying devices, which are carried by uprights or brackets G' in the front of the machine. Supported between the brackets and extending transversely across the machine is an acid-trough G^2.

G^3 is a rock-shaft journaled in sliding boxes *g* in the brackets G'.

H represents a series of feed-tubes mounted on the shaft G^3, as by the eyes *h*, and may be adjusted thereon by set-screws *h'*. The tubes H are open at one end and closed at the lower end, preferably by an adjustable plug h^2. Adjacent to the closed end is an orifice h^3. Normally the tubes are supported by the rock-shaft G^3, with their lower ends immersed in the acid, which flows into the tube through the orifice h^3. When the tubes are lifted, all of the acid escapes through the orifice, except so much as lies below it, and by the adjustment of the plug h^2 the quantity of acid contained in the tubes may be nicely regulated.

H' represents a series of funnels corresponding in number with the feed-tubes H, mounted on a transverse shaft or bar h^4. To permit ample adjustment of the funnels H', I prefer to support them on the bar or shaft h^4 by means of sleeves h^5, provided with tubular extensions adapted to receive the funnels. The sleeves may be adjustably clamped on the bar or shaft h^4 by set-screws h^6, and the funnels may be adjusted and held in the tubular extensions by set-screws h^7.

H^3 are lifting-rods located one at each end of the trough G^2 and connected at their ends with a transverse lifting-bar H^4, extending transversely across the machine. The upper ends of the rods H^3 engage the shaft G^3, so that when the bar H^4 is raised the shaft G^3 and its journal-boxes *g* will be raised also.

I have shown the rods H^3 H^3 extending through the ends of the trough and engaging the shaft G^3 by yokes. It is apparent that the rods may be on the outside of the trough and may be connected directly with the boxes *g*.

H^5 is an upwardly-extending arm on one end of the shaft G^3.

I is a rocking lever fulcrumed to one of the brackets G', adjacent to the end of the shaft carrying the arm H^5, and having its end I' extending upward in position to strike the arm when the shaft is elevated. The other end of the lever I is connected by a link I^2 with a lever J, fulcrumed at *j* to one of the side frames A. The free end of the lever is operated by a cam 3 on the shaft C. A spring *j'* between the lever J and a stationary part of the machine holds the bearing end of the lever, which may be provided with the usual roller j^2, in contact with the cam and produces the return movement.

G^4 is a counterbalance-weight carried by the shaft G^3.

G^5 is a stop carried by one of the boxes *g* to support the counterbalance-weight and limit its downward movement.

The operation of the acid-supplying devices is as follows: When the cans have been brought under the bar H^4 by the feeding-frame E' and are lifted by the frames D D, the tops of the cans act on the bar H^4 and lift it, which, through the rods H^3, raises the shaft G^3 and lifts the tubes H out of the troughs. Each tube when thus lifted carries only so much acid as is contained below the orifice h^3. When the shaft G^3 is raised, the arm H^5 is in position to be acted on by the lever-arm I', which is at this movement actuated by the action of the cam 3 on the lever J and is thrown forward, so as to strike the arm H^5 and rock the shaft G^3 on its bearings. When the shaft G^3 is thus rocked, the tubes H are turned over, so that the acid contained in them passes out into the funnels H' and drops upon the cans. The lever I then rocks back under the action of the spring *j'* and the counterweight G^4 rocks the shaft G^3 back and restores the tubes H to their upright position. When the cans are lowered by the supports D D, the lifting-bar H^4 is released and the journal-boxes *g* and shaft G^3 drop back into normal position. The stop G^5 rises with the shaft G^3 and prevents the counterbalance-weight G^4 from acting to rock the shaft G^3 in the opposite direction when the shaft is raised and before the lever-arm I' acts. I have shown the feeding funnels and tubes arranged in pairs to feed on each side of the cap of each can. While this is preferable, a single feeding tube and funnel may be employed, and the funnels H' may be omitted, if desired. I prefer to use the funnels, however, as they may be brought close to the caps of the cans, and thus insure the acid being deposited at the proper places and avoid splashing.

The Soldering Devices.

K are the soldering-irons, which are located in the rear of acid-feeding devices and above

the line of movement of the cans. The irons K are the usual cylindrical irons having beveled soldering-edges *k* and are arranged side by side across the machine in a series corresponding with the number of cans in a single row.

L is a transverse frame extending across the machine, to which the bearing-frames L′ of the soldering-irons are suitably secured. The spindle of each soldering-iron is journaled in its appropriate bearing-frame. In order that the iron may bear with considerable weight on the top of the can, the spindle is made in sections, the upper portion acting to receive the motion from the driving mechanism and the lower portion being so connected therewith that it shall have capacity for slight vertical movement.

K′ is the lower portion of the spindle, which is made integral with the iron K or positively connected with it.

K^2 is a cylindrical section having at its lower end a bearing-sleeve K^3, which fits over the upper end of the spindle K′ and is secured thereto by a set-screw *k′*. The bearing-sleeve K^3 rests upon a bearing-plate L^2, carried on a bracket *l* of the frame L′, through which the spindle K′ extends.

K^4 is a coupling-piece (shown as a bearing-sleeve) fitting over the end of the section K^2 and secured to it by a set-screw k^2. The bearing-sleeve K^4 rests on a bearing-plate L^3, carried by a bracket *l′* of the frame L′, through which the section K^2 extends.

K^5 is the upper section of the spindle, which is journaled in a bracket l^3 of the frame L′. The section K^5 is connected with the bearing-sleeve K^4 by a loose coupling *m*, which will permit the sleeve K^4 and the parts connected with it to move slightly in a vertical direction without breaking the driving connection. As shown, this coupling consists of lugs *m′* on the sleeve K^4 and notches m^2, adapted thereto, on the section K^5. The location of these notches and lugs may, of course, be reversed, or any other suitable coupling that will permit the rising-and-falling movement without destroying the driving connection may be employed.

M is a transverse shaft journaled on the upper portion of the machine, upon which are mounted a series of bevel-gears M′, which gear with corresponding bevel-gears M^2, each on a spindle m^3, journaled in each of the brackets l^3. On each spindle m^3 is a pinion M^3, by which motion is transmitted to a pinion M^4 on each upper spindle-section K^5. By these means the various capping-irons are driven from the shaft M. The shaft M is driven from the shaft B by means of the sprocket-chain N and the sprocket-wheels N′ N^2 on the shafts B and M, respectively.

The bearing edges of the bearing-sleeves K^3 and K^4 and of the corresponding bearing-plates L^2 L^3 may be beveled, as shown. As the spindle of the iron is supported at two points by the bearings K^3, and K^4 it is held more steadily. The use of the bearing-sleeves enables adjustment to be made with great ease for the purpose of taking up wear.

Any iron K may be removed without disconnecting or displacing any of the bearings or driving connections by simply detaching the spindle K′ from its sleeve K^3. The spindle of each iron is hollow throughout, and through each spindle the usual weighted rod O extends, which is adapted to rest on the center of the cap and hold it in place while the soldering-irons are operating. For the purpose of positively actuating these rods O, so as to lift them from the soldered caps when the cans are lowered, I employ intermittently-acting lifting devices, which I shall now describe.

O′ is a transverse rock-shaft extending across the upper part of the machine.

O^2 are a series of arms carried by the rock-shaft O′ and each loosely engaging one of the rods O, so as to lift it when they are elevated. I have shown the arms O^2 provided with eyes *o* on their ends, located immediately below the weighted ends of the rods.

O^3 is a crank on the end of the rock-shaft O′, connected by a link or rod O^4 with a lever O^5, journaled, as at *o*, to one of the side frames A. The lever O^5 is operated by a cam 4 on the shaft C to pull the rod downward, and thus rock the shaft O′. The weight of the heads of the rods O will hold the lever O^5 in contact with the cam 4 and return the parts to their normal positions.

P are the burners, of which one or more may be located adjacent to each capping-iron. These burners are shown branching from a pipe P′, to which air and gas may be supplied through the valved pipes P^2 P^3. The pin-valve *p* may be employed in the burners to regulate the size of the flame.

Q is a hood supported by brackets Q′ and surrounding the irons K. The spindles K′ extend through openings in the hood, which may be closed by a plate *q*, resting in seats *q′* on the top of the hood. The hood serves to confine the heat about the irons.

To prevent the overheating of the spindle and rod O and to permit the heat rising through the hollow spindle to escape, an opening *p′* is made therein, preferably in the section K^2, as shown, Fig. 9.

The operation of the soldering devices is as follows: When the cans in their forward movement are brought under the irons K, they are lifted by the rising of the frames D D. As the ends of the rods O project below the irons, these rods rest on the caps and are lifted by the cans, so that the weight of each rod acts to hold the cap in place. The cans are raised in contact with the irons and slightly lift them, so that the weight of the iron is acting on the top of the can. This is permitted by the loose couplings or joints *m* in the spindle. The solder is then fed, (by the devices described hereinafter,) and as it reaches the hot irons it is melted and falls into the grooves about the caps, in which it is distributed by

the rotating irons in the usual manner. When the cans are lowered, the cam 4 depresses the lever O^5 and lifts the rods O from the caps and holds the rods elevated until the next row of cans is brought under the irons, when they are again released and act upon the caps, which holds them in place.

It is highly desirable in a can-capping machine that the soldering-irons should be capable of adjustment to suit cans of different sizes. Heretofore it has been usual to support the irons in permanent bearings and to center or adjust the cans under them. This has been usually done by means of depressions in the trays and necessitated the use of special trays for each size of cans. It has been difficult to properly center the cans in the ways, and a slight variation in the adjustment will destroy the alignment. To obviate these difculties, I make the soldering-irons adjustable, so that they may be brought nearer together or farther apart to suit the size of the cans, which may be placed side by side upon the tray. For this purpose the supporting-frames L′ in which the soldering-irons are carried are made laterally adjustable on the cross-frame L. The frame L is shown with a longitudinal guide l^4, on which the frames L′ may be moved. The frames L′ may be secured in any adjusted position, by bolts l^5, passing through slots l^6 in the frame L. When the frames L′ are adjusted, the driving connections M and the rod-lifting arms O^2 are correspondingly adjusted.

The Solder-Feeding Devices.

R are the loose spools on which the solder-wire is wound and from which it is fed to the soldering-irons. These spools are carried on brackets R′ on the sides of the machine. I have shown a set of spools on each side, each set to feed to one-half of the irons. The feeding mechanism is located adjacent to the sides of the machine and draws the solder-wire from the spools and feeds it to the irons. I have shown this feeding mechanism on each side.

R^2 is the frame of the feeding mechanism, which is suitably supported on the machine, as by the bracket R′.

R^3 is a shaft journaled in the frame R^2 and carrying on its end a bevel-gear R^4.

S are feeding wheels or disks mounted on the shaft R^3 and having roughened or toothed peripheries *s*, so as to seize and pull the solder-wire. I have shown the disks S keyed on the shaft R^3 and separated by intermediate collars S′.

S^2 is a shaft carried in the upper part of the frame R^2, on which are journaled bifurcated arms S^3, in which are journaled idler-rollers T, adapted to act in conjunction with the toothed disks S in feeding the solder-wire. The rollers T are drawn with a yielding pressure toward the disks S by means of springs t' between the outer ends of the arms S^3 and frame R^2. The rollers T are preferably provided with peripheral grooves *t*, adapted to receive the peripheries of the disks S and guide the wire which passes between. Guide-nipples T′ on the frame R^2, on the side adjacent to the spools R and in line one with each pair of rollers S T, guide the wire from the spools to the feeding-rollers. T^2 are similar guide-nipples on the other side of the frame, by which the wire is guided from the feeding-rollers.

T^3 are guiding-tubes leading from the nipples T^2, each to one of the soldering-irons, so that one strip of wire will be fed through each one of the tubes to one of the soldering-irons. I have shown the tubes inserted in a bar T^4, fastened to the frame R^2, adjacent to the nipple T^2.

The feeding-disks S are rotated intermittently by a ratchet U on a shaft *u*, journaled in the side frame A and provided with a bevel-gear U′, engaging the bevel-gear R^4 of the shaft R^3 of the respective sets of feeding-disks.

V is a rocking lever journaled on the shaft *u* and carrying a loose pawl V′, which is provided on its rear end with an extension *v*′.

V^2 is a weighted lever fulcrumed on the rocking lever V and carrying a projection or extension v^2, located above the extension *v*′ of the pawl and adapted, when the lever v^2 is allowed to fall under the action of its weight, to press upon the extension *v*′ and rock the pawl and throw its front end into engagement with the teeth of the ratchet U.

The lever V is connected by a link v^3 with a rocking lever V^3, which has its fulcrum at v^4 at the lower part of the machine and is rocked by a cam 5 of the shaft C. A spring v^5 holds the lever in operative contact with the cam and imparts the return movement. The lever V^3 may be provided with an anti-friction-roller v^6 at the point where it makes contact with the cam. The cam 5 imparts a rocking movement to lever V, so that the ratchet U and the solder-feeding devices will be operated whenever the pawl V′ is thrown into engagement with the ratchet-teeth.

In order that the feeding of the solder to the irons may take place only when the cans are in place under the irons, it is desirable that the engagement of the pawl V′ should be controlled by the cans or by the carrying and feeding devices.

W is a slide located in guides *w*′ *w*′ on the side frame and provided with one or more lugs or projections *w*, extending out over the plane of travel of the can-trays and immediately above the tray when it is in its lowest position, so as to be struck thereby when the tray is lifted to bring the cans in contact with the irons. The slide W is normally depressed, as by a spring W′ between the upper bearing *w*′ and a collar W^2 on the slide.

W^3 is a sustaining lever or arm having its fulcrum at w^2 on one of the side frames and its upturned end sustaining the weighted lever V^2, which controls the pawl V′. The sustaining end of the lever W^3 may be provided with a roller w^3.

W^4 is a short lever connected at one end with the sustaining-arm W^3 by a link W^4 and engaging at its other end a socket in the collar W^2.

When the can-tray is lifted to bring the cans in contact with the irons, it engages the lugs w of the slide W and elevates the slide. This upward movement of the slide rocks the lever W^4 and pulls the sustaining-arm W^3 down, so as to permit the weighted lever V^2 to fall. This downward movement of the lever V^2 causes the pin or lug v^2 to act on the extension v' of the pawl V' and throws the outer end of the pawl into engagement with the ratchet-teeth, so that the movement of the lever V (to the left in Fig. 2) will turn the ratchet, and thus feed the wire to the various irons in the manner heretofore described. By these means the feeding of the wire takes place only when the cans are in position to receive the solder.

To prevent the feed-tubes T^3 becoming overheated and thus melting the solder as it passes through them, the hood Q may be provided with a facing X of asbestos adjacent to the feed-tubes, and as a further precaution blasts of cold air may be blown upon the tubes by air-tubes Y, leading from air-pipe Z.

From the foregoing description the operation of the machine will be readily understood.

The cans with the caps in place are put upon the trays E, which are then placed on the frames D D. The projections e of the feeding-frame E' engage the rear edges of the trays. The forward reciprocation of the feed-frame E' moves the trays forward over the frames D D and the upward movement of the frames D D lifts the trays from the feed-frame E', which then moves back and engages the trays when they are again lowered. The trays are thus alternately moved forward and raised and lowered. When in their forward movement a row of cans has been brought under the acid-supplying devices G and has been lifted, that mechanism is operated in the manner heretofore described to supply acid to the cans. The cans then descend and move forward again and are again lifted, when the acid is applied to the next row of cans. When the cans in their forward movement reach a position under the rotating irons and are lifted, the solder-feeding devices are thrown in operation in the manner described and the soldering operation takes place. The trays are then lowered, and the forward movement brings the next row of cans under the soldering-irons and the operation is repeated. New trays of cans may be constantly supplied at the front end and the trays of capped cans may be removed from the rear end, so that the operation of the machine may be continuous. The acid-feeding to one row of cans will take place simultaneously with the soldering of another set.

The details of construction that have been shown may be varied without departing from the invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a can capping machine, the combination with acid feeding devices, and soldering mechanism, of feeding devices for alternately moving the cans forward and raising and lowering them, and intermediate control devices controlled by the lifting of the cans for throwing the acid feeding and soldering devices into action when the cans are lifted.

2. In a can capping machine, the rocking acid feeding tubes H having the orifice h^3 adjacent to the bottom and the adjustable plug h^2 closing the bottom, by the adjustment of which the quantity of acid retained in the tube H may be regulated.

3. In a can capping machine, an acid feeding tube having an adjustable bottom by the adjustment of which the quantity of acid taken by the tube may be regulated.

4. In a can capping machine, the acid feeding devices embracing the rocking acid feeding tubes, and the stationary supply funnels for receiving the acid from the feeding tubes and supplying it directly to the cans.

5. In a can capping machine, the acid feeding device embracing rocking acid feeding tubes, supporting devices for feeding funnels, and stationary feeding funnels adjustably supported in said supporting devices, adapted to receive the acid from the rocking feeding tubes and supply it directly to the cans and by their adjustment to have their feeding ends in proper position with reference to the cans.

6. In a can capping machine, the acid supplying devices consisting of the combination with the acid trough, of the rock shaft located above the acid trough, movable bearing for the shaft, a lifter bar located below the trough and adapted to be struck by the rising cans, connections between the lifter bar and the rock shaft, whereby the shaft will be raised when the lifter bar is actuated, feeding tubes carried by the rock shaft and extending into the acid trough, and actuating devices to rock the shaft when it is elevated.

7. In a can capping machine, the acid supplying devices consisting of the combination with the acid trough, of the rock shaft located above the acid trough, movable bearing for the shaft, a lifter bar located below the trough and adapted to be struck by the rising cans, connections between the lifter bar and the rock shaft, whereby the shaft will be raised when the lifter bar is actuated, feeding tubes carried by the rock shaft and extending into the acid trough, an arm carried by the shaft, and a rocking arm adapted to strike the arm of the shaft when the shaft is elevated and thereby rock the shaft and invert the acid tubes.

8. In a can capping machine, the acid supplying devices consisting of the combination

with the acid trough, of the rock shaft located above the acid trough, movable bearing for the shaft, a lifter bar located below the trough and adapted to be struck by the rising cans, connections between the lifter bar and the rock shaft, whereby the shaft will be raised when the lifter bar is actuated, feeding tubes carried by the rock shaft and extending into the acid trough, an arm carried by the shaft and a rocking lever I having an arm extension I′ adapted to strike the arm of the shaft when the shaft is elevated and thereby rock the shaft.

9. In a can capping machine, the acid supplying devices consisting of the combination with the acid trough, of the rock shaft located above the acid trough, movable bearing for the shaft, a lifter bar located below the trough and adapted to be struck by the rising cans, connections between the lifter bar and the rock shaft, whereby the shaft will be raised when the lifter bar is actuated, feeding tubes carried by the rock shaft and extending into the acid trough, an arm carried by the shaft and a rocking lever I having an arm extension I′ adapted to strike the arm of the shaft when the shaft is elevated and thereby rock the shaft, a cam actuated lever J and a connection between the lever J and the rocking lever I.

10. In a can capping machine, the acid supplying devices consisting of the combination with the acid trough, of the rock shaft located above the acid trough, movable bearing for the shaft, a lifter bar located below the trough and adapted to be struck by the rising cans, connections between the lifter bar and the rock shaft, whereby the shaft will be raised when the lifter bar is actuated, feeding tubes carried by the rock shaft and extending into the acid trough, an arm carried by the shaft, a rocking arm adapted to strike the arm of the shaft when the shaft is elevated and thereby rock the shaft and invert the acid tubes, and a counter-weight carried by the rock shaft and adapted to restore it to normal position when the actuating rocking arm moves back.

11. In a can capping machine, the acid supplying devices consisting of the combination with the acid trough, of the rock shaft located above the acid trough, movable bearing for the shaft, a lifter bar located below the trough and adapted to be struck by the rising cans, connections between the lifter bar and the rock shaft, whereby the shaft will be raised when the lifter bar is actuated, feeding tubes carried by the rock shaft and extending into the acid trough, an arm carried by the shaft, a rocking arm adapted to strike the arm of the shaft when the shaft is elevated and thereby rock the shaft and invert the acid tubes, a counterweight carried by the rock shaft, and a stop carried with the shaft and acting on the counter weight to sustain it until the rock shaft is operated by the actuating rocking arm.

12. In a can capping machine, the combination with feeding devices to move the can trays forward and to raise and lower them intermittently, of acid feeding devices adapted to supply acid to the cans, and intermediate mechanism for controlling the operation of the acid feeding devices actuated by the lifting of the cans.

13. In a can capping machine, the combination with feeding devices to move the can trays forward and to raise and lower them intermittently, of feeding funnels to feed acid to the cans, acid feeding devices for supplying acid to the feeding funnels, and intermediate mechanism for controlling the operation of the acid feeding device actuated by the lifting of the cans.

14. In a capping machine, a rotary driven spindle, a bearing therefor, gearing for driving the spindle, a capping iron journaled in a stationary bearing frame below the driven spindle, and a loose coupling between the driven spindle and the capping iron whereby the capping iron may play vertically.

15. In a can capping machine, the combination with the frame L′, of the spindle K^5 journaled therein, gearing for operating the spindle K^5 carried by the frame L′, and the capping iron having its spindle journaled on the frame L′ and connected with the spindle K^5 by a loose coupling.

16. In a can capping machine the combination with the cross-frame L, of a series of independent iron supporting frames L′ carried thereby, the rotary capping irons having their spindles journaled in the independent frames L′, and power devices for rotating the spindles of the capping irons.

17. In a can capping machine, the combination with the cross frame L, of a series of independent frames L′ carried thereby, the capping irons having their spindles journaled in the frames L′, the rotary shaft M, and intermediate power transmitting connections between the shaft M and the spindles of the capping irons.

18. The combination with the frame L, of the frame L′ carried thereby, the capping iron operating spindle K^5 journaled in the frame L′, the gear M^4 on the spindle K^5, the transverse rotary shaft M and intermediate gearing between the shaft M and gear M^4.

19. In a can capping machine, the combination with the capping irons, solder feeding devices, and tray lifting apparatus for raising the cans to the capping irons, a pawl and ratchet for operating the solder feeding devices, and mechanism controlled by the lifting of the cans for holding the pawl and ratchet out of operation until the cans are lifted to the irons.

20. In a can capping machine, the combination with the capping irons, solder feeding devices, the tray lifting apparatus for raising the cans to the capping irons, a pawl and ratchet for operating the solder feeding devices, a trip for throwing the pawl into en-

gagement with the ratchet, and mechanism controlled by the lifting of the cans for holding said trip out of operation.

21. In a can capping machine, the combination with capping irons, solder feeding devices, and tray lifting apparatus for lifting the cans to the capping irons, of mechanism for operating the solder feeding devices, a spring pressed slide W adapted to be operated by the cans when they are lifted to the irons, and intermediate control devices between the slide W and the mechanism for operating the solder feeding devices to hold said devices out of operation except when the cans are lifted.

22. In a can capping machine, the combination with the capping irons, solder feeding devices, and tray lifting apparatus for lifting the cans to the capping irons, of a pawl and ratchet for operating the solder feeding devices, a trip-lever adapted to throw the pawl into engagement with the ratchet, and devices controlled by the lifting of the cans for holding said trip-lever out of action.

23. In a can capping machine, the combination with the capping irons, solder feeding devices, and tray lifting apparatus for lifting the cans to the capping irons, of a pawl and ratchet for operating the solder feeding devices, a trip-lever adapted to throw the pawl into engagement with the ratchet, the slide W adapted to be actuated by the lifting of the cans, the arm W^3 acting on the trip lever to hold it out of action, and connections between the slide W and the arm W^3.

In testimony of which invention I hereunto set my hand.

JOHN M. COLBERT.

Witnesses:
ERNEST HOWARD HUNTER,
GILBERT W. LYNCH.